UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/679,719	10/06/2003	Susan G. Yan	8540G-000169	2872

27572 7590 02/01/2006

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. BOX 828
BLOOMFIELD HILLS, MI 48303

EXAMINER	
PURVIS, SUE A	
ART UNIT	**PAPER NUMBER**
1734	

DATE MAILED: 02/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	**Application No.** 10/679,719	**Applicant(s)** YAN ET AL.	
	Examiner Sue A. Purvis	**Art Unit** 1734	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 January 2006*.
2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,8-14 and 43* is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-4,8-14 and 43* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a)☐ All b)☐ Some * c)☐ None of:
1.☐ Certified copies of the priority documents have been received.
2.☐ Certified copies of the priority documents have been received in Application No. _____.
3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 13 January 2006, with respect to the rejections of claims 1-4, 9-14, and 43 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, new grounds of rejection is made, and since this rejection is based on the claims as amended on 01 September 2005, this rejection is made FINAL.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 4, 9, 11, 12, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Wilson et al. "Thin-film catalyst layers for polymer electrolyte fuel cell electrodes" (hereafter "Wilson") in view of R.B. Moore et al. "Procedure for Preparing Solution-Cast Perfluorosulfonate Ionomer Film and Membranes" (hereafter "Moore") and Wilson '777 (US Patent No. 5,234,777).

Regarding claims 1 and 43, Wilson discloses a method of making a membrane electrode assembly (MEA) comprising: forming a slurry including an ionomer (Nafion), a carbon electrically conductive material, a Pt catalyst and a glycerol[1] solvent mixed with water (Section 3.1, first paragraph); applying the slurry onto a substrate (Teflon (tetrafluoroethylene/ polytetrafluoroethylene) blank in Fig. 1) which has sufficient structural integrity to be reusable (See Figure 1 and protocol step 4 on page 3); drying or removing the applied slurry in protocol step 5 on page 3 to form a film; bonding the film to the membrane (See Figure 1, step d); and peeling the Teflon blank from the film. (Figure 1.)

---

[1] Glycerol has a boiling point 290°C.

Moore discloses using solvents which have lower boiling points and, as set forth in Wilson '777, these solvents yield equivalent properties to glycerol solvents, but at lower process temperatures. (See p. 2549 of Moore; Col. 6, lines 50-66 of Wilson '777.)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a solvent having a lower the boiling point, such as within the range of 100°C and 200°C, because Moore teaches the feasibility of using a solvent having a lower boiling point and, as stated in Wilson '777, the use of using lower boiling point solvents results in lower processing temperature.

Regarding claim 4, the substrate blank is Teflon and Teflon meets the criteria of having a suitable surface energy. Furthermore, it is known that Teflon has a low surface energy within the claimed range.

Regarding claim 9, hot pressing of the catalyst/blank onto the membrane is performed at temperatures above the glass transition temperature of Nafion, which is 105°C. (Protocol step 5, page 3.)

Regarding claim 11, the electrically conductive material is carbon and the catalyst is platinum.

Regarding claim 12, the ionically conductive material is Nafion which is a trade name for a pefluorosulfonate ionomer.

4. Claims 2, 13, and 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson in view of Moore and Wilson '777 as applied to claim 1 above, and further in view of Tou (U.S. Patent No. 5,518,831).

Wilson does not disclose the step is of cleaning the substrate after peeling the substrate from the film with a solvent. Wilson teaches that prior to using the blank upon which the catalyst film is formed, the substrate is first cleaned.

Tou teaches that he substrate surface should be clean (free from contamination). It can be cleaned by washing with an alcohol solvent such as isopropanol or0 methanol prior to application of the polymer/catalyst layer. Thus removing dirt, contaminants, and additives, including wetting agents from the surface. (See paragraph bridging columns 7 and 8).

The motivation for cleaning the substrate surface with a solvent such as methanol prior to using the substrate is that it provides a clean surface upon which the catalyst layer can be deposited. Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made based on the teachings of Tou to modify the teachings of Wilson by cleaning the substrate prior to use or reuse since it would have provided a clean surface upon which the catalyst layer would have been deposited on.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson in view of Moore and Wilson '777 as applied to claim 1 above.

Wilson in view of Moore and Wilson '777 does not discuss in detail the thickness of the Teflon blank, but Wilson does suggest that thickness of the material is important to an artisan in order to achieve a desired end.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a substrate within the range of claim 3, because Wilson teaches the importance of thickness and as such, the examiner is taking official notice that the claimed ranged is within the purview of one of ordinary skill in the art based on experimentation and the ultimate design desired by the artisan. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson in view of Moore and Wilson '777 as applied to claim 1 above, and further in view of Artysiewicz et al. (US Patent No. 6,180,163 B1).

Wilson in view of Moore and Wilson '777 does not discuss in detail the thickness of the Teflon blank, but Wilson does suggest that thickness of the material is important to an artisan in order to achieve a desired end.

Artysiewicz discloses that the a blank 5 mils thick is within the purview of the artisan. (Col. 16, lines 8-13.)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a substrate within the range of claim 3, because Wilson teaches the importance of thickness and Artysiewicz demonstrates that a thickness within the claimed ranged has been used previously.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson in view of Moore and Wilson '777 as applied to claim 1 above, further in view of Sompalli et al. (US Patent No. 6,524,736).

Wilson discloses using a glycerol and water solvent mixture, but it would have been obvious to one having ordinary skill in the art at the time the invention was made that additional solvents could be used as solvents and their properties are known to an artisan. Moore and Wilson '777 disclose dimethyl sulfoxide as a possible solvent. Moore also suggests ethylene glycol as a choice. As set forth in Moore, the artisan appreciates advantages exist for using different solvents. Moore suggests dimethyl sulfoxide (DMSO) and ethanol as alternatives to glycerol. Sompalli discloses that well known alternatives to ethanol is n-butanol. (Col. 8, lines 21-65.)

It would have been obvious to one having ordinary skill in the art at the time the invention was made that the solvents disclosed in Moore are not the only solvents with a boiling point lower than 200°C which can be used. It is within the purview of the artisan to using different solvents, such as n-butanol which is disclosed in Sompalli.

8. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson in view of Moore and Wilson '777 as applied to claim 1 above, and further in view of Grot (U.S. patent No. 5,330,860).

Wilson in view of Moore and Wilson '777 does not disclose how the material is coated onto the substrate.

Grot teaches using transfer catalyzation wherein an electrode ink comprising a platinum catalyst on a carbon supporting material is printed on a suitable substrate, such as TEFLON.RTM. or paper, it has been possible to form electrodes containing as little as 0.2 mgm/cm.sup.2 of precious metal. In particular, these electrodes, which are essentially decals formed from a supported platinum catalyst electrode ink are painted or sprayed on the substrate and then dried and hot pressed onto ion exchange membranes. This so-called decal process of applying the electrode ink to the surface of the membrane has been successful but involves the arduous process steps of forming the electrode decal and then transferring it to the membrane. (See paragraph bridging columns 2 and 3).

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to coat the substrate in Wilson by printing or spraying the coating onto the substrate as taught by Grot '860 because it would have provided efficient and effective process for forming the catalyst layer onto the substrate to form a film.

Response to Arguments

9. Applicant's arguments with respect to the claims have been considered but are moot in view of the new grounds of rejection.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sue A. Purvis whose telephone number is (571) 272-1236. The examiner can normally be reached on Monday through Friday 9am to 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher A. Fiorilla can be reached on (571) 272-1187. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sue A. Purvis
Primary Examiner
Art Unit 1734

SP
January 27, 2006